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WHITE-TAILED DEER IMMUNOCONTRACEPTION USING PORCINE ZONA PELLUCIDA AND RECOMBINANT RABBIT ZONA PELLUCIDA VACCINES

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Abstract: We conducted a feasibility study with natural porcine zona pellucida (PZP) and two recombinant rabbit zona pellucida vaccine preparations (RZP-1 & RZP-2) to obtain foundational information for developing an immunocontraceptive vaccine to control reproduction in white-tailed deer (*Odocoileus virginianus*). The recombinant vaccines were expressed in a pEX-2 *E. coli* vector along with a cro-B-galactosidase bacterial fusion protein. The expressed proteins were conjugated to Protein A to increase their immunogenicity.

The zona pellucida (ZP) is an acellular glycoprotein layer surrounding the mammalian oocyte. Sperm must bind to a ZP receptor and penetrate the zona for conception to occur. Numerous investigators have shown that antibodies to ZP proteins block conception by preventing sperm binding and penetration. Thirty-two (32) captive white-tailed does were divided into four groups of 8 each and injected with a 500 mcg prime dose of each preparation as follows: Group 1, (sham controls) physiological saline in complete Freund's adjuvant (CFA); Group 2, PZP in CFA; Group 3, RZP-1 in CFA; and Group 4, RZP-2 in CFA. Each prime dose was followed by a 300 mcg booster dose at 21 and 51 days.

All sham controls produced twin fawns. PZP, RZP-1 and RZP-2 each prevented conception in 5 of 8, 2 of 7, and 0 of 8 does, respectively. The number of fawns/doe averaged 2.0, 0.5, 1.1, and 2.0 in Groups 1, 2, 3, and 4, respectively. Average frequency of observed breeding was higher in PZP immunized does than in sham controls or does immunized with RZP-1 or RZP-2 (1.8 vs 0.5, 0.3 and 0.5/doe, respectively). RZP-2, which was a multiple vaccine preparation, was ineffective. Research is planned to improve the presentation of the RZP antigens to the immune system to enhance their effectiveness as deer immunocontraceptive agents.